WARZYN



August 28, 1992

Ms. Karen Martin (P-19J)
Community Relations Coordinator
United States Environmental Protection Agency
77 West Jackson
Chicago, Illinois 60604

Re: Transmittal of Comments on the
Proposed Plan for Remedial Action
American Chemical Services NPL Site
Griffith, Indiana

Dear Ms. Martin:

Attached to this letter are comments on the United States Environmental Protection Agency's (U.S. EPA) Proposed Plan for Remedial Action for the American Chemical Services (ACS) National Priorities List site, located in Griffith, Indiana. These comments were prepared at the request of the ACS Site Organizational Group Steering Committee, on behalf of its constituent members.

It is expected that this document will be included in the Administrative Record and that the U.S. EPA will prepare a written response in accordance with the National Contingency Plan.

Thank you for your attention to this matter.

Sincerely,

WARZYN INC.

Joseph D. Adams, Jr., P.E.
Vice President

MJH/llr/JDA
[chi-108-16]
60251

CHICAGO

WARZYN

PROJECT
20007001/290

# COMMENTS ON THE PROPOSED PLAN FOR REMEDIAL ACTION

# AMERICAN CHEMICAL SERVICES NATIONAL PRIORITIES LIST SITE GRIFFITH, INDIANA

AUGUST 1992

*PREPARED FOR:*

STEERING COMMITTEE

*ACS ORGANIZATIONAL GROUP*

• • •

*PREPARED BY:*

WARZYN INC.

*ADDISON, ILLINOIS*

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PROJECT
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# COMMENTS ON THE PROPOSED PLAN FOR REMEDIAL ACTION

# AMERICAN CHEMICAL SERVICES NATIONAL PRIORITIES LIST SITE
## GRIFFITH, INDIANA

AUGUST 1992

*PREPARED FOR:*
STEERING COMMITTEE
*ACS ORGANIZATIONAL GROUP*

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*PREPARED BY:*
WARZYN INC.
*ADDISON, ILLINOIS*


Mark Rothas for

Martin J. Hamper
Project Manager

J. Adams

Joseph D. Adams, Jr.
Vice President

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# 1

# EXECUTIVE SUMMARY

This document presents comments on the United States Environmental Protection Agency's (U.S. EPA) Proposed Plan for Remedial Action (Proposed Plan) for the American Chemical Services (ACS) National Priorities List (NPL) site, located in Griffith, Indiana. The document was prepared by Warzyn Inc. (Warzyn) and Conestoga-Rovers and Associates Limited (CRA) at the request of the ACS Site Organizational Group Steering Committee, on behalf of its constituent members (hereinafter, the alleged "PRPs"). Attachment 1 provides a listing of members.

In June 1992, the U.S. EPA provided notice of its Proposed Plan for the ACS site. The Proposed Plan included a discussion of the Remedial Investigation, a summary of site risks, a discussion of each of the alternatives evaluated in the Feasibility Study (FS) and a description of U.S. EPA's Preferred Remedy. In the Proposed Plan, U.S. EPA recommends Alternative 6B with modifications (in bold) as the preferred remedy. Components of the remedy include:

- Site Wide - Off-site incineration of intact buried drums; off-site disposal of miscellaneous debris; in-situ vapor extraction pilot study for contaminated soils.

- On-Site Area - in-situ vapor extraction of contaminated soils; in-situ vapor extraction pilot project for selected buried wastes, **with low temperature thermal treatment (LTTT) as a contingent technology.**

- Off-Site Area - in-situ vapor extraction (ISVE) of contaminated soils; on-site low temperature thermal treatment (LTTT) of buried wastes (**with vapor emission control during excavation, and possible immobilization of wastes after treatment; treatment residuals would be required to meet health-based levels prior to redepositing back into excavations**).

- Groundwater - groundwater pump and treatment; treated water controlled discharge to wetlands; continued evaluation and monitoring of wetlands.

- Griffith Municipal Landfill - continued monitoring and eventual closure under State Law.

The PRPs, Warzyn and CRA are in general agreement with most components of the Proposed Plan. However we disagree with U.S. EPA with three key requirements:

- Inclusion of health-based standards in the Record of Decision (ROD)

- LTTT as a backup technology if ISVE cannot meet soil cleanup standards

- Selection of LTTT for Off-Site Containment Area buried wastes

All three requirements are especially important at this point in the remedy selection process because they could result in a substantial change to the basic features of the proposed remedy with respect to scope, performance and cost. Therefore, in accordance with Section 300.430 (f) (3)(ii) of the National Contingency Plan (NCP), the U.S. EPA would be required to seek additional public comment by issuing a Revised Proposed Plan. The third requirement is important because restricting the ROD to a single technology for treatment of buried waste in the Off-site Containment Area may mandate that a ROD modification be made should LTTT be unable to meet the, as yet undefined, health-based standards.

The main difference between the technological approach selected by the U.S. EPA in its Proposed Plan and our preferred approach is the manner in which the Off-Site Containment Area wastes are addressed. We believe that the U.S EPA should allow for the opportunity to pilot test ISVE in the Off-Site Containment Area. If the ISVE pilot test is unsuccessful, then pilot tests for LTTT and Slurry Phase Biological Treatment (SPBT) would be conducted. This approach will allow for the most technically appropriate remedy to be implemented factoring in field engineering constraints. Acceptance of this approach by the U.S. EPA will satisfy NCP requirements. This approach would not require additional public comment, consequently the U.S. EPA would be able to select the remedy by September 30, 1992. Furthermore, the U.S EPA's Proposed Plan is not in accordance with the NCP, because more suitable alternatives exist as established by the nine-criteria analysis prepared in accordance with Section 300.430 (b) (3) (iii) of the NCP, and provided in Appendix A.

This nine criteria analysis clearly established that alternatives exist that better satisfy the key criteria components. In particular, these alternatives better satisfy the CERCLA statutory preference for the use of permanent and treatment technologies, long-term remedy effectiveness, short-term effectiveness, as well as the remaining criteria.

This approach allows multiple technologies to be evaluated and employed as warranted, based upon field conditions. It is likely that ISVE will be effective for a significant portion of the site. ISVE should be given the opportunity to be used, so long as residuals that pose significant risk are satisfactorily addressed. This approach comports with the NCP and promotes the use of treatment technologies as most appropriate. Also, it is clearly consistent with the U.S EPA initiatives to promote the use of on-site treatment technologies. This tailored, flexible approach best recognizes the practical realities that affect the success of the available technologies.

Section of LTTT for Off-site Buried Waste

We believe that the U.S. EPA should provide the opportunity to pilot test ISVE in the Off-Site Containment Area concurrent with the pilot test for the On-Site waste area. While it would be difficult to use a rigorous waste analysis program to determine success, the extracted vapors will indicate if VOCs are being removed and the pressure gradients will indicate the area being influenced by ISVE. If vapors are successfully extracted, ISVE would provide a comparable level of protection of human health and the environment with significantly less short-term risk than ex-situ technology, and at a lower cost. If unsuccessful, pilot testing of LTTT and SPBT would be conducted to determine which ex-situ technology would be the most effective in treating the complex waste mixtures found at the site.

The Proposed Plan acknowledges the benefits of ISVE of buried waste, but the U.S. EPA decided not to include ISVE for the Off-Site Containment Area in the Proposed Plan "due to the large number and random distribution of buried drums" (Proposed Plan, Page 23). Test pits were not conducted in the Off-site Containment Area during the RI because, based on available information at the time, it was believed that drums were buried at depth and test pits would not be useful in determining the extent of buried waste. However, during the Public Meeting for the Proposed Plan held by U.S. EPA in June 1992, several residents of the Town of Griffith stated that the drums were not actually buried in an excavation below the water table, but rather were placed on the original ground surface and covered over with adjacent soils. This new information would explain ground surface contours in the Off-Site Containment Area which show the area to be above surrounding natural ground contours. The U.S. EPA said in the public meeting that they do not, in fact, know if any intact containers exist in the Off-Site Containment Area.

This new information could have a substantial impact on the scope, effectiveness and cost of the remedy. These cannot be reasonably anticipated because additional investigation would be required to determine the validity of this new information. It is possible that by conducting a relatively small number of test pits in the Off-site Containment Area, it can be shown that the buried drums could be addressed as with the On-site Containment Area. If this is the case, then ISVE would be an effective method for addressing the wastes in the Off-site Area. If it is determined that ISVE is not appropriate for the site, then pilot scale testing of LTTT or SPBT could be conducted.

We request that the requirement for LTTT of Off-site Containment Area wastes not be included in the Proposed Plan. As an alternative, we request that the Proposed Plan allow test pits in the Off-Site Containment Area to determine the validity of new information gained after notice of the Proposed Plan. We request that the Proposed Plan allow the consideration of ISVE, if the results of the test pits show that any intact drums can be adequately addressed by other means.

The Proposed Plan states that LTTT would be a contingent remedy for waste areas if pilot scale testing of ISVE show it to be ineffective. We request that the Proposed Plan remove LTTT as a specified contingent remedy and allow pilot scale testing of both LTTT and SPBT if the pilot scale testing for ISVE is not acceptable. The FS is clear that the wastes at the ACS site are complex, both in terms in the number of contaminants present and the wide range of concentrations of contaminants. This is acknowledged by U.S. EPA in the Proposed Plan.

The FS presents discussions of the strengths and weaknesses of both LTTT and SPBT. Both LTTT and SPBT are viable technologies for use in treating the waste at the site. Vendors of each technology are confident that their specific equipment and methods would be effective in treating these complex wastes. Only site specific pilot scale tests will determine with any degree of certainty which technology would best achieve NCP Requirements.

We request that the Proposed Plan allow the contingent pilot testing of both LTTT and SPBT to be conducted concurrently, rather than specifying LTTT as the contingent remedy. Because the tests would be run concurrently and because pilot scale testing would be required of LTTT before it could be implemented, in any event, there would be no impact on the remediation schedule. Instead, the treatment technology that best achieves NCP requirements would be selected as a contingent remedy for ISVE.

Health-Based Standards

The Proposed Plan states that the remedy must meet health-based standards, but provides no explanation as to why that approach was adopted, or of the standards themselves. "Preliminary Remediation Goals" were included in the Administrative Record without explanation as to their purpose, or documentation supporting the calculated numbers. The U.S. EPA Remedial Project Manager has stated that U.S. EPA expects to include numerical health-based standards in the ROD, but had not decided, as of August 20, 1992 what the standards would be.

We object to the expected inclusion of health-based standards in the ROD for many reasons. For one, it is obvious that the ability of a given remedial technology to meet cleanup objectives cannot be anticipated without knowing those objectives. Because U.S. EPA has not determined what health-based standards will be, the potentially significant effects on the scope, performance and cost of the remedy cannot be reasonably anticipated. Therefore, the actual inclusion of health-based standards in the ROD could result in a significant change which will require the public notice of a Revised Proposed Plan.

For this site, we believe that the development of acceptable clean-up standards is best determined during the negotiating period for the remedial design. U.S. EPA guidance, Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions (Office of Solid Waste and Emergency Response Directive 9355.0-30), and Guidance on Risk Characterization for Risk Managers and Risk Assessors (U.S. EPA February 26, 1992), state that the following factors need to be considered when developing health-based standards:

- information on the range of exposures derived from exposure scenarios and on the use of multiple risk descriptors (i.e. central tendency, high end of individual risk, population risk, important subgroups, if known)

- most probable future use scenarios

- appropriate cancer risk level between 10-4 to 10-6

- evaluation of assumptions used to quantify risk (such as reference doses for dermal exposure), and the sensitivity of calculated risk to various assumptions.

If the above factors have been evaluated by U.S. EPA, they are not included in the Administrative Record and we object to not having the opportunity to review any such evaluation before the finalization of standards. If they have not been developed, then it is not probable that a thoughtful evaluation can be conducted by either U.S. EPA or one of its consultants to undergo appropriate technical review within the U.S. EPA within the short time needed to complete the ROD for filing before September 30, 1992. We request that the U.S. EPA defer the development of acceptable clean-up standards to after submittal of the ROD. If this cannot be accomplished, then we believe that a Revised Proposed Plan that sufficiently addresses these issues must be submitted for public comment before the ROD is prepared.

LITT as a Backup Technology if ISVE Cannot Meet Soil Cleanup Standards

Based on the RI, it is estimated that up to 98% of the organic contaminants are VOCs. SVOC's and metals are less prevalent and much less mobile. The soils and waste will be addressed by both treatment and containment. ISVE will remove and treat VOC's and some SVOCs which are the most prevalent and mobile compounds in the soils and waste. This mitigates the potential migration to groundwater or volatilization to air. The residuals will be contained by a combination of covering soils at the surface and operation of the groundwater pump and treat system. Protection of human health from dermal contact for both current and future use scenarios is provided by the soil cover, groundwater pump and treat system, access restrictions, and institutional controls.

The Proposed Plan states that ISVE has to meet health-based standards for soil, or LTTT would be required as a contingent technology. The FS is clear in acknowledging that ISVE will not treat all of the contaminants at the site, in particular, certain SVOCs and metals. If the intent of the Proposed Plan is to have ISVE meet health-based standards for all contaminants, it would negate the use of ISVE for the treatment of soils. Therefore, U.S. EPA would actually be mandating Alternative 7B (LTTT of both soils and waste), the cost of which is estimated to be $64.4 million. Obviously, this is a significant change from the $33 to $46.8 million presented in the Proposed Plan.

The ROD should specifically state that an ISVE pilot test will be performed in the defined contaminated soil areas for design purposes only.(e.g., well spacings, air flow rate requirements). The installation of a full-scale ISVE system in the defined contaminated soil areas should not be contingent upon soil test results compared to health-based standards. Because of the complicated contaminant matrix at the site, and the limited duration of a design level ISVE pilot test, it is not feasible, or necessary, to fully demonstrate the ability of ISVE to meet health-based standards as part of a short-term ISVE pilot test.

Summary

In general we agree with many of the aspects of the remedy for the ACS site. However, we disagree with the U.S. EPA on three key aspects that could have potentially significant effects on the scope, performance and cost of the remedy. These effects cannot be reasonably anticipated based on the information in the

Proposed Plan. The U.S. EPA's Proposed Plan did not adequately present the potential remedy costs resulting in an inadequate cost comparison. Our approach would not require additional public comment, effectively meets the nine-criteria consistent with the NCP, and is more protective due to the comparatively lower short-term risks posed by ISVE versus an ex-situ technology. Our approach will also benefit the CERCLA program by testing inovative technologies on difficult to treat materials.

We request that U.S. EPA defer some decisions on the scope of the remedy until the negotiating period for the RD/RA. Our requests in no way diminish the overall protectiveness of the remedy and also would not impact U.S. EPA's ability to meet a September 30, 1992 ROD deadline. If our requests cannot be met, then we request that U.S. EPA prepare a revised Proposed Plan for public comment.

In the following document, we provide a more detailed discussion of the points made in the Executive Summary. We also present additional discussion of the evaluation of the overall protectiveness of the proposed remedy and a remedy with our proposed modifications. Finally, we present 19 detailed comments on the Proposed Plan for which we request a formal response.

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# INTRODUCTION

This document presents comments on the United States Environmental Protection Agency's (U.S. EPA) Proposed Plan for Remedial Action (Proposed Plan) for the American Chemical Services (ACS) National Priorities List (NPL) site, located in Griffith, Indiana. This document was prepared by Warzyn Inc. (Warzyn) and Connestoga-Rovers Limited (CRA) at the request of the ACS Site Organizational Group Steering Committee, on behalf of its constituent members (hereinafter, the alleged "PRPs") (See Attachment 1 for listing of members).

In June 1992, the U.S. EPA provided the public notice of its Proposed Plan for the ACS site. The U.S. EPA's Proposed Plan includes:

- In-situ vapor extraction of contaminated soils
- Off-site incineration of intact buried drums
- Off-site disposal of miscellaneous debris
- Groundwater pump and treatment of contaminated groundwater
- On-site low temperature thermal treatment (LTTT) of Off-Site Containment Area buried wastes
- In-situ vapor extraction (ISVE) in On-site Area buried wastes, if the pilot test is successful, otherwise LTTT will be used
- Closure of the Griffith Municipal Landfill under State Law

The PRPs, Warzyn, and CRA are in general agreement with most aspects of the Proposed Plan. However, we disagree with U.S. EPA in three key areas:

- Inclusion of health-based standards in the Record of Decision (ROD)
- LTTT as a back-up technology if ISVE cannot meet health-based soil standards
- Selection of LTTT for Off-Site Containment Area buried wastes

All three requirements are especially important at this point in the remedy selection process because they could result in a substantial change to the basic features of the proposed remedy with respect to scope, performance and cost. Therefore, in accordance with Section 300.430 (f) (3)(ii) of the National Contingency Plan (NCP), the U.S. EPA would be required to seek additional public comment by issuing a Revised Proposed Plan. The third requirement is important because restricting the ROD to a single technology for treatment of buried waste in the Off-site Containment Areas may mandate that a ROD modification be made should LTTT be unable to meet the, as yet undefined, health-based standards. In addition, the U.S. EPA has eliminated the opportunity to remediate wastes in the Off-Site Containment Area using an insitu technology (i.e., ISVE). Given the difficulties and risks associated with ex-situ remediation, the U.S. EPA should allow the opportunity to evaluate ISVE in the Off-Site Containment Area.

The Proposed Plan states that the remedy must meet health-based standards, but provides no explanation as to why that approach was adopted, or of the standards themselves. "Preliminary Remediation Goals" were included in the Administrative Record without explanation as to their purpose, or documentation supporting the calculated numbers. The U.S. EPA has indicated that it expects to include numerical health-based standards in the ROD, but had not decided, as of August 20, 1992, what the standards would be. We believe that numerical health-based standards should not be included in the ROD, because we have not been given an opportunity to review and comment on the health-based standards, and their derivation. The U.S. EPA has provided comments to us throughout the entire RI/FS process. The issue of establishing cleanup criteria has not been brought to our attention. We feel that it is important that the cleanup objectives be consistent with, and achievable by, the selected technology(ies) in the Proposed Remedy (e.g., ISVE).

The Proposed Plan states that soils treated with ISVE must meet health-based standards, or face further treatment by excavation and LTTT. The NCP indicates that the ROD shall "Indicate, as appropriate, the remediation goals....that the remedy is expected to achieve." (40 CFR 300.430 (f)(5) (iii)(A)). Because ISVE is designed to treat soils contaminated with VOCs, it is **reasonable** to assume that only VOC standards will be set for ISVE treated soils. Non-volatile contaminants would be remediated through containment. Hence, it would be inappropriate to set non-volatile constituent standards for ISVE, because ISVE is not expected to treat non-volatile contaminants.

If health-based standards are set for constituents beyond the treatment capability of ISVE (such as SVOCs), then LTTT of soils is really the selected technology. If standards are set for constituents not reasonably expected to be treated by ISVE, then we believe that this is a significant change to the costs presented in the Proposed Plan, which will require the public notice of a revised Proposed Plan in accordance with the National Contingency Plan (NCP) 40 CFR 300.430 (f)(3)(ii). Because the U.S. EPA has not determined what the health-based standards will be, the potentially significant effects of undefined health-based standards on the remedy **cannot be reasonably anticipated**.

The containment aspects of the Proposed Plan protect human-health and the environment. Groundwater contamination migration is addressed by the groundwater pump and treatment system. Institutional controls and covering mitigate the potential for direct contact with wastes. The ISVE reduces the potential for VOCs to be released to the ambient air, and groundwater. The less mobile SVOCs, PCBs and metals are bound up in the soil and wastes and pose little potential for groundwater contamination.

The PRPs originally recommended Alternative 5 as the remedy for the ACS site. This recommendation is supported mainly by the fact that the U.S. EPA has agreed to the concept of Alternative 5 by allowing a pilot study for in-situ soil vapor extraction (ISVE) for the On-site Area in their Proposed Plan. As an alternative to selecting Alternative 5 outright, we suggest modification of the Proposed Plan to include the sequential pilot testing of several different treatment methods within the defined waste areas at the site. The final selection of remedial action for the defined buried waste areas would be contingent upon the performance of the tested remedial technologies which would include ISVE, first, followed by LTTT and SPBT, if necessary.

The basis for the PRPs preference for ISVE versus ex-situ treatment of the defined buried waste areas is based on a comparative analysis of these technologies versus the nine evaluation criteria used during the entailed analysis portion of the Feasibility Study (FS). This analysis is included as Appendix A.

The main point the PRPs would like to make is that they desire to determine, through field testing, if ISVE treatment of the defined buried waste areas, or possibly another treatment method, may offer acceptable long term effectiveness and permanence at a lower cost with a potential reduction of short-term risk. Other comments reflect the desire for consistency between the Proposed Plan and the FS. U.S. EPA objections to the FS should have been resolved through negotiations prior to issuing the Proposed Plan rather than through supplementing the FS in the Proposed Plan.

The following sections provide detailed changes that we would like incorporated into the ROD for the ACS site, and detailed comments on the Proposed Plan.

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# RECOMMENDED CHANGES TO THE U.S. EPA'S PROPOSED PLAN

We believe that changes could be made to the Proposed Plan that would result in a more innovative and successful Remedial Action. The following recommended changes to the U.S. EPA's Proposed Plan are designed to enhance the chances for success of the Remedial Action. Modifications of the Proposed Plan to incorporate these recommended changes would still meet the requirements of the National Contingency Plan (NCP) by **treating** the most mobile contaminants that pose the majority of risk and **containing** residual contaminant concentrations following treatment that do not pose a future risk of groundwater impact. The most mobile contaminants are the VOCs, which make-up to 98% of the organic contaminants detected at the ACS site (Table 1). VOCs comprise up to 96.8% of the total risk for the various current and future exposure scenarios (see Table 7-19 through 7-37 of the Baseline Risk Assessment). An insitu treatment such as ISVE, which could address the majority of the contamination and risk at the site (i.e., VOCs), without the added risks to workers and the public posed by excavation, is worth a try. Residual contamination at the site would be adequately addressed by containment of the less mobile constituents.

The following changes incorporate the use of innovative technologies that could benefit the CERCLA program as a whole. The proposed changes will not change the timeframe for the Remedial Action, nor will they result in increased risk to the public.

1. The ROD should incorporate soil/waste clean-up levels based upon the technology selected by the U.S. EPA. Because of the complicated contaminant matrix present at the ACS Site, the proposed technologies may not be capable of achieving potentially overly conservative health-based cleanup standards not yet defined by the U.S. EPA. The U.S. EPA is expected to select the most appropriate technology to address the

contamination at the site, and it is reasonable to set the clean-up standards at the practicable limitations of the selected technology. Setting clean-up standards beyond the reach of the selected technology guarantees the perception of failure of the remedy, even though the remedy may have mitigated the risks to public health. Technology-based cleanup approaches have been used in RODs for other NPL sites (Table 2).

If a technology-based approach is not acceptable at this time, then remediation goals should not be included in the ROD, but deferred until the negotiations for the remedial design.

2. To provide the best opportunity to evaluate the potential applicability of technologies to the On-Site and Off-Site defined waste areas at the site, it is requested that the ROD allow the bench and pilot scale testing of several technologies to determine which technology will be the most cost-effective for the waste matrix. The technologies proposed for further evaluation are ISVE, LTTT, and SPBT. Valuable and needed information will be generated regarding the ability of these technologies to provide cost-effective remediation of the wastes at the site, which will have benefits to the CERCLA program as a whole.

   ISVE in the Off-Site Containment Area should be evaluated concurrently with ISVE in the On-site waste area. Test pits can be excavated in the Off-Site Containment Area to assist in evaluating the possible presence of intact drums. If it is determined that ISVE is not appropriate, then bench and pilot scale testing of LTTT and SPBT can be conducted.

3. The ROD should not specify that vapor emissions be controlled without first determining the need for such controls via field screening.

4. Treatment of PCB containing soils and wastes should not be required. because they can be adequately addressed by containment.

5. Treatment of heavy-metal containing soils or wastes should not be required, because they can be adequately addressed by containment.

6. The ROD should not include a contingent remedy to ISVE for soils. The Proposed Plan seems to imply that if ISVE treatment in the defined contaminated soil areas does not meet health-based cleanup criteria, the entire volume will be excavated for treatment by LTTT (i.e., Alternative 7B). We do not feel this type of contingent remedy is appropriate. Once a remedy is finalized and the cost of a full-scale ISVE system is incurred, there should not be a future contingency to scrap that remedy and incur the cost of an entirely

different technology. The U.S. EPA's selection of ISVE in the Proposed Plan has been made, because it is considered an appropriate technology for the contaminant matrix at the ACS site. As stated above, the establishment of cleanup criteria must be consistent with what is achievable by the selected remedy (e.g., ISVE). An allowance for containment of residuals following treatment is also a viable approach and should be included in the ROD in lieu of specifying LTTT as a contingency technology.

7. The ROD should specifically state that an ISVE pilot study will be performed in the defined contaminated soil areas for design purposes only (e.g., well spacings, air flow rate requirements). The installation of a full-scale ISVE system in the defined contaminated soil areas should not be contingent upon soil test results compared to health-based standards. Because of the complicated contaminant matrix at the site, and the limited duration of a design level ISVE pilot study, it is not feasible or necessary to fully demonstrate the ability of ISVE to meet established health-based cleanup criteria as part of a short-term pilot study.

8. The ROD should also include some acknowledgement of the limitations of current groundwater remediation technologies. It should also provide the framework to allow for the development of alternative cleanup objectives or the issuance of an impracticability waiver. The U.S. EPA has included similar language in RODs for analogous sites (e.g., Rockaway Borough Wellfield, New Jersey, and Fairfield Coal Gasification Plant, Iowa). A similar approach and corresponding wording in the ROD can also be taken for the soil/wastes (i.e., would be analogous to setting technology-based cleanup criteria).

9. Since ISVE of the defined contaminated soil areas has been selected by the U.S. EPA, health-based cleanup levels should not be established for the semi-volatile organic compounds (SVOCs). It is not likely that enhanced subsurface biodegradation of the SVOCs using an ISVE/bioventing approach will be sufficient to degrade the SVOCs to health-based cleanup levels. The primary target SVOCs in the defined soil and waste areas identified as part of the FS (i.e., phthalates, carcinogenic PNAs, and chlorinated benzenes) are typically only marginally biodegradable under optimum conditions. Containment is a viable approach for these SVOCs, because they were not detected in groundwater samples and are immobilized in the soil environment by natural attenuation mechanisms.

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# 4

# DETAILED COMMENTS ON THE U.S. EPA PROPOSED PLAN

The following are detailed comments on the U.S. EPA Proposed Plan for the ACS site.

1. The U.S. EPA stated in the Proposed Plan that treatment residuals must meet "health-based " standards, but did not include specific clean-up levels in the Proposed Plan, or a rationale for selecting the health-based approach, allowing no opportunity to comment on them. Preliminary Remediation Goals (PRGs) were included in the Administrative Record (No. 203), but no explanation of the development or potential applicability was included in the Administrative Record. Since numerical remediation goals were not included in the Proposed Plan, it is assumed that they will not be included in the ROD without providing opportunity for public comment on the development and appropriateness of such health-based standards.

2. We do not believe that the development of health-based standards is appropriate for the site. However, if the U.S. EPA requires that they be developed, then they should be determined during the negotiating period for the remedial design. U.S. EPA guidance, Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions (Office of Solid Waste and Emergency Response Directive 9355.0-30), and Guidance on Risk Characterization for Risk Managers and Risk Assessors (U.S. EPA, February 26, 1992), state that the following factors need to be considered when developing health-based standards:

- Information on the range of exposures derived from exposure scenarios and on the use of multiple risk descriptors (i.e., central tendency, high end of individual risk, population risk, important subgroups, if known)

- Most probable future use scenarios

- Appropriate cancer risk level between $10^{-4}$ to $10^{-6}$

- Evaluation of assumptions used to quantify risk (such as reference doses for dermal exposure), and the sensitivity of calculated risk to various assumptions

If the above factors have been evaluated by the U.S. EPA, they are not included in the Administrative Record, and we object to not having the opportunity to review the evaluation before the finalization of standards. If the U.S. EPA has not evaluated these factors, then it is not probable that a thoughtful evaluation can be conducted by either the U.S. EPA or one of its consultants to undergo appropriate technical review within the U.S EPA with the short time remaining to complete the ROD by the September 30, 1992 deadline. We request that the U.S. EPA defer the development of clean-up standards until after the issuance of the ROD. If this cannot be accomplished, then we believe that a Revised Proposed Plan that sufficiently addresses these issues must be submitted for public comment prior to issuance of the ROD.

3. The PRG values cited above indicate that the U.S. EPA is considering the use of a residential exposure scenario and a $1 \times 10^{-6}$ cancer risk, based upon the Baseline Risk Assessment for the ACS site. The Baseline Risk Assessment should not be used to determine appropriate clean-up levels, because it uses an absolute worst-case approach, well beyond the mandated "reasonable maximum exposure" approach. This was acknowledged by the U.S. EPA's oversight consultant (Weston letter to B. Swale, 4/3/91, AR No. 121). The U.S. EPA defines "reasonable maximum" such that only potential exposures that are likely to occur will be included in the assessment of exposures" (55FR8710). It is unlikely that the ACS site could ever be developed for residential use, so the use of a residential exposure scenario is inappropriate for the ACS site. There is reasonable certainty that the ACS site will remain for industrial use only, given the current industrial manufacturing processes on-going at the site, the proximity of a landfill, and the treatment residuals expected to remain at the site, therefore, a $1 \times 10^{-6}$ cancer risk for the ACS site is inappropriate (55FR8717). A less stringent cancer risk of $1 \times 10^{-4}$ is more appropriate for this industrial setting. Table 4

presents representative RODs where cancer risk levels other than $1x10^{-6}$ have been selected by the U.S. EPA.

4. The NCP and the U.S. EPA guidance "Preparing Superfund Decision Documents" states that "the most appropriate remedy for a specific site frequently will be a combination of "**treatment** and **containment**". The Proposed Plan includes a combination of treatment and containment, apparently recognizing that residuals will remain at the site post-treatment. However, the Proposed Plan specifies reducing all waste concentrations to health-based levels, which is not consistent with the "Expectations of Remedial Actions", Guidance on Preparing Superfund Decision Documents, U.S. EPA, EPA/540/G-90/007, July, 1989. The first expectation in the guidance manual states that "remedies should **either** reduce all wastes to health-based levels **or** manage contaminants to such an extent that there is a high degree of certainty that future exposures will not harm human health or the environment" (highlighting added).

   The containment aspects of the Proposed Plan provide the greatest protection to human health and the environment. Groundwater contamination migration will be addressed by a pump and treat system. Institutional controls will mitigate the potential for direct contact with the wastes. The less mobile SVOCs, PCBs, and metals are bound up in the soils and waste, and pose little potential for groundwater contamination. This U.S. EPA guidance indicates that containment is considered more likely to be appropriate for immobile wastes that do not pose substantial long-term threats, with examples cited:

   - "Wastes... that are substantially immobile or can otherwise be reliably contained over long periods of time." The SVOC and metal contamination at the ACS site are substantially immobile.

   - "Wastes that are technically difficult to treat, such as mixed wastes of widely varying composition." The wastes at the ACS site are technically difficult to treat and are of widely varying composition.

   - "Wastes with characteristics such that a treatment-based remedy would increase overall risk to human health and the environment due to risks posed to workers, the community, or the environment during implementation." An ex-situ treatment method would increase the overall risk at the ACS site.

   The Proposed Plan should reflect that containment is consistent with U.S. EPA guidance and appropriate for the less mobile constituents found at the site which do not pose long-term threats, because there is a high degree of certainty that containment of the difficult to treat, less mobile constituents will not harm human health and the environment, and ex-situ treatments increase overall risk at the site.

5. The Proposed Plan states that both On-Site and Off-Site Area Soils contaminated with VOCs/SVOCs will be treated with ISVE, but if it is determined by the U.S.EPA that final remediation goals cannot be met, then VOC/SVOC contaminated soil will be excavated, treated by LTTT to health-based standards, and redeposited. The NCP states that the ROD shall "*Indicate, **as appropriate**, the remediation goals...that the remedy is* expected to achieve." (Emphasis added)(40 CFR 300.430 (f)(5)(iii)(A)). Because ISVE is designed to treat materials contaminated with VOCs, it is **reasonable** to assume that only VOC standards will be set for ISVE treated soils. It would be **inappropriate** to set non-volatile constituent standards for ISVE, because ISVE is not expected to treat non-volatile contaminants.

   The FS pointed out that ISVE would not treat SVOCs in the soils to health-based levels, but that the SVOCs are relatively immobile and would not require further treatment, because the potential threat to groundwater will be mitigated. Even without any treatment, SVOCs have had little impact on the groundwater, based upon data collected in the Remedial Investigation. ISVE will remove some of the SVOCs, but the remedy should rely upon containment to mitigate the low-level residual risk remaining after the ISVE clean-up. The U.S. EPA has stipulated containment remedies for SVOCs and other residual organic and inorganic contaminants for other CERCLA RODs involving analogous types of sites (Table 3).

   The ROD should specifically state that an ISVE pilot study will be performed in the defined contaminated soil areas for design purposes only (e.g., well spacings, air flow rate requirements). The installation of a full-scale ISVE system in the defined contaminated soil areas should not be contingent upon soil test results compared to health-based standards. Because of the complicated contaminant matrix at the site, and the limited duration of a design level ISVE pilot study, it is not feasible to fully demonstrate the ability of ISVE to meet established health-based cleanup criteria as part of a short-term pilot study.

6. If health-based standards are set beyond the treatment capability of ISVE (such as standards for SVOCs, or metals), then LTTT of soils is really the selected technology. If standards are set for constituents **not reasonably expected** to be treated by ISVE, then we believe that this is a significant change to the Proposed Plan, which will require the public notice of a

revised Proposed Plan in accordance with the NCP (40 CFR 300.430 (f)(3)(ii)). Because the U.S. EPA has not determined what the health-based standards will be, the potentially significant effects of undefined health-based standards on the remedy **cannot be reasonably anticipated**.

We believe that health-based standards should not be included in the ROD for the above reasons.

7. We believe that the U.S. EPA should provide the opportunity to pilot test ISVE in the Off-Site Containment Area. If the pilot test is successful, ISVE would be the least costly Remedial Action that provides a comparatively effective level of protection, as required by the NCP (55FR8727). We believe that ISVE provides a comparatively effective level of protection as compared to LTTT as outlined in the Proposed Plan, but at a lower cost.

   The Proposed Plan indicated that both ISVE and LTTT treatment of buried wastes met the threshold criteria, and so both are eligible for selection based upon their cost effectiveness. ISVE treatment of the buried waste areas, if successful, would adequately mitigate the risks posed by the ACS site by reducing the amount of VOCs in the wastes, which make-up the largest percentage of the risk at the site for a given exposure scenario, according to the Baseline Risk Assessment for the ACS site. Since ISVE treatment has been selected for contaminated soils in the Proposed Remedy, treatment residuals will likely remain at the site regardless of the technology that is selected for the buried waste areas. This will require containment and institutional controls to be included as part of the final remedy. The use of containment and institutional controls to mitigate the risk associated with the SVOCs is consistent with the NCP and has been stipulated in other CERCLA RODs (Table 3).

   RODs for other CERCLA sites were reviewed to evaluate the U.S. EPA's past selection of ISVE for remediating sites containing VOCs and SVOCs. ISVE treatment is selected over three times more often in CERCLA RODs than ex-situ bioremediation and LTTT. As of 1991, 84 RODs specified ISVE. ISVE was selected for other sites that were also contaminated with SVOCs, PCBs, metals, or other non-volatile contaminants.

   Since ISVE treatment in the buried waste areas has the potential to provide a comparatively effective level of protection, the U.S. EPA should allow the opportunity to demonstrate the effectiveness of ISVE for all the buried wastes, because it is the lower cost technology. If ISVE for waste areas proves unsuccessful, bench and pilot testing of LTTT and SPBT should be conducted.

8. The U.S. EPA indicated in the Proposed Plan that ISVE is not appropriate for the Off-Site Containment Area due to the large number and random distribution of buried drums.

The Proposed Plan acknowledges the potential effectiveness of ISVE for contaminated soils throughout the site, and also potentially for buried wastes in the On-Site waste area. The type of wastes, contaminants, and soil conditions are similar for the On-Site and Off-Site buried wastes as shown during the RI. The only significant difference between the areas noted by the U.S. EPA is the unknown condition and location of drums in the Off-Site Containment Area. Data regarding past operations at the site strongly suggest that few, if any, intact drums remain. This conclusion is based on the following:

- Wastes that were liquid would have been incinerated in the on-site incinerator.
- A drum recycling operation existed in the Kapica/Pazmey Area. Drums in good condition would be expected to be recycled because they had a cash value. Therefore, only drums in bad condition would be disposed in the Off-Site Containment Area.
- ACS personnel have stated that drums were crushed prior to being disposed in the Off-Site Containment Area.

The presence of drum carcasses does not necessarily inhibit ISVE performance. If the drums were crushed or ruptured prior to, or during placement, then there is very little difference between wastes in the drums and wastes dumped from drums onto soil. In fact, the porosity of crushed drums is greater than soils and would permit more venting than soils. In addition, residual wastes in drums are not adsorbed to metal like they are to soil. That volatilization of VOCs from a metal surface is more efficient than from soil grains using ISVE.

The U.S. EPA should allow the opportunity to determine the condition of drums in the Off-Site Containment Area by a limited series of test pit excavations prior to conducting ISVE pilot testing in waste areas, similar to the test pits excavated during the RI. This could be completed within a relatively short time frame, and would resolve key issues for determining the feasibility of ISVE for the Off-Site Containment Area. If intact drums are found they can be excavated and removed from the site.

9. Test pits were not conducted in the Off-Site Containment Area during the RI because, based upon available information at the time, it was believed that drums were buried at depth and test pits would not be useful in determining the extent of buried waste. However, during the Public meeting for the Proposed Plan held by the U.S EPA in June 1992, several residents of the Town of Griffith stated that the drums were not actually buried in an excavation below the water table, but rather were placed on the original ground surface and covered over with adjacent soils. This new information would explain ground surface elevation contours in the Off-Site Containment Area, which show the area to be above surrounding natural ground elevation contours. The U.S. EPA said in the public meeting that they do not, in fact, know if any intact containers exist in the Off-Site Containment Area.

   This new information could have a substantial impact on the scope, effectiveness and cost of the remedy. These cannot be reasonably anticipated because additional investigation would be required to determine the validity of this new information. It is possible that by conducting a relatively small number of test pits in the Off-Site Containment Area, it can be shown that the buried drums could be addressed as with the On-Site Containment Area. It this is the case, then ISVE could be an effective method for addressing the wastes in the Off-site area. If after conducting test pits, it is determined that ISVE is not appropriate for the site, then pilot scale testing of LTTT and SPBT could be conducted.

   We request that the requirement for LTTT of Off-Site Containment Area wastes not be included in the Proposed Plan. As an alternative, we request that the Proposed Plan allow test pits in the Off-Site Containment Area to determine the validity of new information gained after notice of the Proposed Plan. If test pits indicated that ISVE may be applicable, then the ROD should allow for pilot testing of ISVE in the Off-Site Containment Area.

10. Soils/wastes should be treated to the extent practicable by the selected technology (i.e., technology-based remediation goals). Technology-based remediation goals have been selected in RODs for other NPL sites (Table 2). A recent draft memorandum issued by the U.S. EPA, titled "Consideration in Groundwater Remediation at Superfund Sites", acknowledges the potential difficulties in achieving groundwater ARARs using conventional pump and treat approaches, and provides the framework for granting impracticability variances. Requiring a pump and treat program to meet MCLs may fail, but requiring a pump and treat program to remediate groundwater to the extent practicable is an achievable remediation goal. In either case, the same

environmental benefit is achieved (i.e., the groundwater was remediated to the extent practicable by the selected technology).

The ROD should include some acknowledgement of the limitations of current groundwater remediation technologies. It should also provide the framework to allow for the development of alternative cleanup objectives or the issuance of an impracticability waiver. The U.S. EPA has included similar language in RODs for analogous sites (e.g., Rockaway Borough Wellfield, New Jersey, and Fairfield Coal Gasification Plant, Iowa).

11. If technology-based remediation goals are not selected for media at this site, the soil/waste clean-up levels should be consistent with the risks posed by these media subsequent to remediation. Exposure scenarios should be limited to trespassers to the site and on-site workers. Exposure scenarios including future use of this site as residential should not be used. It is unlikely that the site would be developed as residential, since treatment residuals will remain at the site and institutional controls implemented. Also, given the limited potential exposure and the factors of safety included into carcinogenic risk calculations, the U.S. EPA proposed clean-up levels should be based upon a cancer risk of 1 x $10^{-4}$ rather than 1 x $10^{-6}$. This risk management level is within the U.S. EPA acceptable range of 1 x $10^{-6}$ to 1 x$10^{-4}$ and reflect the industrial setting (RAGS, U.S. EPA, December 1989). Risk levels other than 1x$10^{-6}$ have been selected in RODs for other NPL sites (Table 4), and is consistent with the NCP, 40 CFR 300.430 (e)(2) "Use of Risk Range". The NCP states "... contaminated soil at an industrial site might be cleaned up to a less stringent standard, but still within the $10^{-4}$ to $10^{-6}$ risk range, than soil at a residential site, as long as their is reasonable certainly that the site would remain for industrial use only ...".

12. An additional reason for not including clean-up levels in the ROD is because the U.S. EPA is currently reconsidering its approach to evaluating risk by including the risk posed to an average person (i.e., central tendency) rather than only the people at the high end of the exposure range (Inside EPA's Superfund Report, July 29, 1992). The U.S. EPA is currently considering the development of national standards for contaminated soils at CERCLA sites, starting with 100 top priority chemicals. The U.S. EPA expects to set clean-up levels for 30 chemicals this fall, with the remaining 70 early next year (Inside EPA's Superfund Report, August 12, 1992).

13. Another potential approach to setting remediation goals would be to utilize the Concentration-Based Exemption Criteria (CBEC) outlined in the U.S. EPA's May 20, 1992 proposed rule (55FR21450-21534). In this proposed rule, the U.S. EPA has developed health-based criteria for soils where no

further special controls would be required, and the U.S. EPA expects them to be considered **preliminary remediation goals**. "When RCRA requirements are identified as ARARs at CERCLA sites because of the presence of RCRA listed hazardous wastes, the Agency believes that the CBEC/ECHO exemption levels will become the preliminary remediation goals..." (57FR21498).

14. The U.S. EPA indicated that by implementing Low Temperature Thermal Treatment (LTTT) in the Off-Site Containment Area concurrent with the ISVE pilot testing in the On-Site waste area, no time will be lost in the overall remediation of the site. Upon implementation of the groundwater pump and treatment system, the site will have been secured. The amount of time required to perform an ISVE pilot test in the Off-Site Containment Area will not add time to the overall remedy. A pilot study for ISVE will be required for the On-site waste area. A pilot study of the ISVE in the Off-Site Containment Area can also be conducted as a parallel activity in the same time frame without delaying the RD/RA process.

15. The U.S. EPA Proposed Plan results in the increase in short-term risk to workers and potentially to nearby residents, due to the excavation of waste materials in the Off-Site Containment Area.

    The U.S. EPA recognized in the Proposed Plan the potential short-term risks associated with the excavation of wastes from the Off-Site Containment Area. Under certain conditions, it can be justified to accept a short-term risk to achieve a long-term goal, but at the ACS site, ISVE may be able to achieve the long-term goal without the short-term risk, or added costs and implementation difficulties. The recent overturning of the Hardage ROD by the U.S. District Court for the Western District of Oklahoma indicates that the U.S. EPA must give greater consideration to short-term risk when selecting a remedy.

16. The U.S. EPA compares the costs of the its preferred remedy unfairly with the costs of other alternatives.

    The total estimated net present value of Alternative 5 in the FS is $33,000,000 with a capital cost of approximately $12,640,000. The total estimated net present value of Alternative 6B in the FS is $37,800,000 to $46,800,000 with a capital ranging from $21,640,000 to $30,640,000. The difference in costs for Alternative 6B in the FS are based on a range of potential volumes of waste requiring excavation and treatment from 35,000 cubic yards to 65,000 cubic yards.

The Proposed Plan suggests conducting an ISVE pilot test in the On-Site Containment Areas, which was not included in the FS Alternative 6B. Since a significant portion of the buried waste volume is located in the Off-Site Containment Area, minimal cost savings would be realized by limiting ISVE treatment of buried wastes to the On-Site Areas. If a potential cost savings is one reason the U.S. EPA is allowing ISVE to be studied in the On-Site Areas, this potential benefit would not be realized unless the Off-Site Areas is also included in this approach (i.e., Alternative 5).

The following are cost increases associated with U.S. EPA modifications to the FS alternatives in the Proposed Plan that have not been properly reflected:

- The Proposed Plan stipulates that both defined areas of contaminated soil and On-Site Area buried wastes would require excavation and treatment by LTTT if ISVE does not achieve health-based cleanup objectives, including for SVOCs. LTTT treatment of the entire site is Alternative 7B. By including this contingency in the Proposed Plan, the U.S. EPA is requiring the cost of an entirely different remedial alternative to be incurred if ISVE does not meet health-based cleanup objectives.

  We do not believe the including of LTTT as a contingency technology as currently stated in the Proposed Plan is appropriate if U.S. EPA considers ISVE to be the technology of choice for the defined contaminated soil areas. As stated previously, ISVE is not likely to meet health-based cleanup criteria for SVOCs through treatment but can be effectively addressed through containment. Based on the estimated volume of contaminated soil in the FS (70,000 to 100,000 cubic yards), the potential cost of implementing LTTT as a contingency technology would increase the costs of the remedy presented in the Proposed Plan by an additional $23 to $35 million. These costs were determined using the LTTT treatment portion of Alternative 7B presented in the FS.

- The Proposed Plan requires elaborate controls during excavation to contain VOC emissions. This could be accomplished by use of a portable structure around active excavation areas to collect emissions, or could be accomplished by using a spray foam to reduce emissions. A mobile structure would require a ventilation system with air collection and treatment prior to discharge to the atmosphere. It is possible that the use of a structure could cause the formation of explosive conditions over a very short time frame, resulting in a very dangerous situation. The use of construction equipment inside a structure itself creates air quality risks to workers, and increases safety risks by restricting vehicle movement. The estimated cost for this type of enclosure is $500,000, but is highly dependant upon the cost of air treatment. A second approach involves the application of a spray foam over the excavation areas prior to excavation, and would subsequently be sprayed on hot spots encountered during excavation to minimize emissions to the atmosphere. The estimated cost for utilizing a spray foam in this manner is $650,000.

- The Proposed Plan says that isolated areas of VOC and metal contaminated soils not treated by the ISVE system would require excavation and LTTT with the wastes. It is intended in the FS that all contaminated soil areas requiring treatment would be treated by ISVE. Technical evaluations during the Remedial Design phase will address the precise location of ISVE wells to remediate contaminated soils. The need for excavating and treating isolated areas of VOC or metal contaminated soils is not apparent based upon data collected and analyzed as part of the RI/FS. An evaluation of the ability to treat or contain contaminated soil areas will be conducted as a part of the RD/RA process.

- The Proposed Plan requires LTTT of soils with PCB concentrations greater than 10 ppm. The areas of PCB contamination do not necessarily overlap the defined buried waste areas. In fact, a majority of samples analyzed for PCBs during the RI were in excess of the U.S. EPA's action level of 10 ppm. By including this requirement in the Proposed Remedy, the U.S. EPA, in essence, has selected Alternative 7B. If this is, in fact, the U.S. EPA's preference, the Proposed Plan should state this and include the cost estimate for Alternative 7B of $64.4 million.

The U.S. EPA has significantly modified Alternative 6B, without reflecting these additions in the cost estimate. This results in an unbalanced evaluation of the cost effectiveness of modified Alternative 6B. Modifications to Alternative 6B in the U.S. EPA Proposed Plan significantly impact the real cost of site cleanup.

17. The Proposed Plan indicates that lead contaminated soils (<500 ppm) would be "immobilized" to meet characteristic treatment standards for metals. This requirement does not appear warranted, since lead and other metals are not identified as target compounds in the upper aquifer (refer to Table 4-1 of the

FS) based on results of the Baseline Risk Assessment, nor were MCLs (i.e., ARARs) exceeded. Metals appear to be immobilized within the contaminant matrix and subsurface soils in which they currently exist. Similar to SVOCs, containment and access controls should be included in the Proposed Remedy to mitigate the risks associated with the lead.

18. Consistent with the U.S. EPA "Guidance on Remedial Actions for Superfund Sites with PCB Contamination" (guidance document), consideration should be given to both containing/capping PCB-impacted areas and specifying a 50 ppm or 25 ppm action level as opposed to 10 ppm. The guidance document specifies a PCB action level for industrial sites of 10 to 25 ppm. Based upon the guidance we feel a 25 ppm action level is more appropriate for the ACS Site, because of the nature of the contaminant matrix, the likelihood that future site uses will remain industrial, and the fact that VOC and SVOC residual contaminant concentrations will still remain at the completion of the final remedy. A 50 ppm action level for treatment or containment would be more appropriate based upon the PCB spill clean-up requirements of 40CRF 701. Under these rules, at the option of the responsible party, the spill may be cleaned-up to 50 ppm PCBs if a label or notice is placed in the area.

    The delineation of PCB concentrations in excess of 10 or 25 ppm do not necessarily overlap the delineation of areas defined as buried wastes. Therefore, areas that exceed PCB action levels significantly overlap areas defined as contaminated soils where ISVE is to be implemented. By requiring PCB concentrations in excess of 10 ppm to also be treated by LTTT as stipulated in the Proposed Plan, the volume requiring excavation, and thus the corresponding costs, will be significantly greater than what was considered in the FS and presented in the Proposed Plan.

    The guidance document allows the use of containment if PCB concentrations are less than 500 ppm for future industrial land uses. PCB concentrations less than 500 ppm are defined as low threat, as opposed to principal threat, in the guidance document for industrial uses. Of all the RI sampling data points, only one had a PCB concentration in excess of 500 ppm (ACS-WS01-01). By stipulating a PCB action level of 25 ppm or 50 ppm and allowing consideration of containment/capping for PCB concentrations less than 500 ppm, the Proposed Remedy and corresponding costs will more clearly reflect what was considered in the FS for Alternatives 5 and 6B.

19. The Proposed Plan requires vapor emissions controls during excavation of wastes. The Proposed Plan should allow for ambient air monitoring prior to the imposition of the use of structures.

The use of a structure could cause the formation of explosive conditions over a very short time frame, resulting in a very dangerous situation. In addition, the use of construction equipment inside a building itself creates air quality risks to workers and increases safety risks by restricting vehicle movement. Ambient air monitoring should first be used to determine if a significant short-term risk to nearby residents exists, prior to committing to the use a potentially dangerous control measure.

[CHI 603 03c]
20007001-Section 4

TABLES

## TABLE 1

### Organic Contaminant Distribution by Group
### American Chemical Services

| | On-Site Containment Area | Spill Bottoms/ Treatment Lagoon | Off-Site Containment Area |
|---|---|---|---|
| VOCs | 98.5% | 94.9% | 89.5% |
| SVOCs | 1.1% | 5% | 10.1% |
| PCBs | 0.4% | 0.1% | 0.4% |

| | Kapica Surface Soil | Kapica Subsurface Soil |
|---|---|---|
| VOCs | 95.8% | 89.1% |
| SVOCs | 3.9% | 9.7% |
| PCBs | 0.3% | 1.2% |

Notes:
1. Volatile Organic Compounds (VOCs) include benzene, ethylbenzene, toluene, xylene, chlorinated ethenes, chlorinated ethanes, chlorinated methanes, and ketones.

2. Semi-volatile Organic Compounds (SVOCs) include phthalates, polynuclear aromatic hydrocarbons, chlorinated propanes, ethers, phenols, and chlorinated benzenes.

3. Based upon weighted averages listed in Tables 4-3 through 4-7 in the ACS Site Feasibility Study.

4. Polychlorinated biphenyls (PCBs)

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[CHI 603 03f]
20007001-Table 1

# TABLE 2

## Representative RODs Employing Technology-Based Criteria American Chemical Services

| | Site | Location | ROD Date | Technology | Cleanup Criteria |
|---|---|---|---|---|---|
| 1. | Tinker Air Force Base | Region 6; Texas | 9/90 | Vapor extraction | 99% removal of organics |
| 2. | Hagen Farm | Region 5; Wisconsin | 9/90 | Vapor extraction | 90% removal of VOCs |
| 3. | Onalaska Municipal Landfill | Region 5; Wisconsin | 8/90 | In-situ bioremediation | 80-95% reduction of organics mass |
| 4. | Rocky Mountain Arsenal | Region 8; Colorado | 2/90 | In-situ vitrification | 99.99% removal of organics |
| 5. | Hardage/Criner | Region 6; Oklahoma | 11/89 | Vapor extraction | 99% reduction in VOC concentrations |
| 6. | Litchfield Airport Area | Region 8; Arizona | 9/89 | Vapor extraction | 99% removal of VOCs |

MJH/njt/
[CHI 401 53]
20007001-Table 2

## TABLE 3

### Representative RODs Employing Containment for Residual Contaminants American Chemical Services

| | Site | Location | ROD Date | Contaminants | Method of Containment |
|---|---|---|---|---|---|
| 1. | Acme Solvent Reclaiming | Region 5; Illinois | 12/90 | VOCs, SVOCs, PCBs and metals | Cover or cap SVOCs, PCBs, and lead contaminated soils |
| 2. | Watkins-Johnson | Region 9; California | 6/90 | VOCs and metals | Vapor extraction with capping and grading to minimize migration of contaminants to groundwater |
| 3. | Wayne Waste Oil | Region 5; Indiana | 3/90 | PAHs | Covering PAH-contaminated soil or consolidating under landfill cap |
| 4. | Miami County Incinerator | Region 5; Ohio | 6/89 | VOCs, SVOCs, PAHs, and metals | Vapor extraction and cap non-volatile contaminant areas |
| 5. | Seymour Recycling Center | Region 5; Indiana | 9/87 | VOCs, SVOCs, and metals | Vapor extraction and cap non-volatile contaminant areas |
| 6. | Hardage/Criner | Region 6; Oklahoma | 11/89 | VOCs, PCBs, and metals | Vapor extraction of source areas followed by installation of RCRA cap |
| 7. | Wheeler Pit | Region 5; Wisconsin | 9/90 | PAHs and metals | Consolidation of waste and contaminated soil and use of RCRA cap |
| 8. | Pristine, Ohio | Region 5; Ohio | 3/90 | VOCs and metals | Vapor extraction treatment and use of RCRA cap |

## TABLE 3 (continued)

### Representative RODs Employing Containment for Residual Contaminants American Chemical Services

| Site | Location | ROD Date | Contaminants | Method of Containment |
|---|---|---|---|---|
| 9. American Thermostat | Region 2; New York | 6/90 | VOCs and metals | Low temperature thermal treatment, backfilling treated soil, and use of soil cover |
| 10. Osborne Landfill | Region 3; Pennsylvania | 9/90 | VOCs, PCBs, PAHs, and metals | Construction of slurry wall with clay cap |
| 11. Walsh Landfill | Region 3; Pennsylvania | 6/90 | VOCs, PAHs, and meals | Construction of landfill cap |
| 12. Stamina Mills | Region 1; Rhode Island | 9/90 | VOCs and metals | Consolidation of waste followed by capping |
| 13. Master Disposal Service Landfill | Region 5; Wisconsin | 9/90 | VOCs and meals | Capping landfill with clay/soil cap and soil cover |
| 14. Algoma Municipal Landfill | Region 5; Wisconsin | 9/90 | VOCs and metals | Capping landfill with soil/clay cover |
| 15. Lewisburg Dump | Region 4; Tennessee | 9/90 | Phthalates and metals | Use of landfill cap |

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[CHI 401 53]

## TABLE 4

**Representative RODs Using Less Stringent Risk Levels American Chemical Services**

| | Site | Location | ROD Date | Selected Cancer Risk Level |
|---|---|---|---|---|
| 1. | Kerr-McGee Oil | Region 5; Wisconsin | 9/90 | $1x10^{-4}$ |
| 2. | Lord Shope Landfill | Region 3; Pennsylvania | 6/90 | $1x10^{-4}$ |
| 3. | Missouri Electric Works | Region 7; Missouri | 9/90 | $1x10^{-5}$ |
| 4. | Sand, Gravel, and Stone | Region 3; Maryland | 9/90 | $1x10^{-5}$ |
| 5. | Sarney Farm | Region 2; New York | 9/90 | $1x10^{-5}$ |

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[CHI 401 53]
20007001-Table 4

A

# A

# Comparative Analysis of ISVE, SPBT, and LTTT

# APPENDIX A

# COMPARATIVE ANALYSIS OF ISVE, SPBT, AND LTTT

This section presents a detailed evaluation and comparison of the nine criteria specified in the NCP for ISVE, slurry phase biological treatment (SPBT), and LTTT treatment of the defined buried waste areas. This detailed evaluation and comparison is based upon the NCP (40 CFR Part 300) and the Interim Final "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA", U.S. EPA, EPA/540/G-89/004, October, 1988. ISVE and LTTT were selected for detailed evaluation and comparison, because previous discussions with the U.S. EPA have indicated that these technologies were both under consideration as being the preferred approach for the defined buried waste areas. SPBT has been included, because it is an innovative technology that warrants consideration for the waste matrix. In addition, the Administrative Record demonstrates (No. 173) that the State of Indiana through IDEM had previously indicated that Alternative 5, involving ISVE treatment of both the defined buried waste and contaminated soil areas, was its preferred remedy. At the July 9, 1992 public hearing, the U.S. EPA said that the State of Indiana had favored Alternative 6. Nothing in the Administrative Record supports this assertion.

## ALTERNATIVE SELECTION CRITERIA OVERVIEW

The U.S. EPA's preferred alternative for a site is presented to the public in a Proposed Plan. The Proposed Plan provides a summary of the alternatives considered in the Feasibility Study (FS). The Proposed Plan should highlight the key factors leading to the identification of the U.S. EPA's preferred alternative. The U.S. EPA's preferred alternative should be selected based upon a detailed "evaluation of the major trade-offs among the alternatives in terms of the nine evaluation criteria" (55FR8724) used in the detailed analysis of alternatives in the FS. The nine evaluation criteria are categorized into three groups for remedy selection: Threshold Criteria, Primary Balancing Criteria, and Modifying Criteria. In order for an alternative to be eligible for selection, the Threshold Criteria must first be met. Secondly, the Primary Balancing Criteria are used to balance the trade-offs identified in the FS detailed analysis. The Modifying Criteria are weighed into the final balancing in determining the remedy, and the extent of permanent solutions and treatment practicable for the site. These are further described below.

- Threshold Criteria

  Overall Protection of Human Health and the Environment: A determination that the alternative, as a whole, achieves and maintains protection of human health and the environment.

  Compliance with Applicable or Relevant and Appropriate Requirements (ARARs): A determination that the alternative complies with ARARs, or if a waiver is required and how the waiver is justified. The assessment also includes other information from advisories, criteria and guidance that the lead and support agencies have agreed are "to be considered".

- Primary Balancing Criteria

  Long-Term Effectiveness and Permanence: An evaluation of the long-term effectiveness in maintaining protection of human health and the environment after response objectives have been met.

  Reduction of Toxicity, Mobility, and Volume Through Treatment: An assessment of the anticipated performance of the specific treatment technologies.

  Short-term Effectiveness: An examination of the effectiveness in protecting human health and the environment during construction and implementation of a remedy until response objectives have been met.

  Implementability: An evaluation of the technical and administrative feasibility, and the availability of goods and services.

  Cost: An evaluation of capital and operation and maintenance (O&M) costs.

- Modifying Criteria

  State Acceptance: This evaluation reflects the state's preference among, or concerns about the alternatives.

  Community Acceptance: This evaluation reflects the community's preference among, or concerns about the alternatives.

## DISCUSSION OF RISK POSED BY SITE

Prior to the detailed comparative analysis between ISVE, SPBT, and LTTT it is important to briefly review the risk posed by the ACS site. A Baseline Risk Assessment was conducted as part of the RI/FS process for the ACS site. The purpose of a Baseline Risk Assessment is to evaluate the potential health risks of the site with regard to a variety of exposure scenarios under the "no action" alternative. The "no action" alternative assumes that no remedial action will take place and no restrictions will be placed upon the future use of the site. In a sense, the Baseline Risk Assessment provides a justification to require remedial action at a site, and identifies the contaminants and potential exposure pathways which may pose health risks to the public. The remedial action selected for a site should mitigate the identified potential exposure pathways to reduce the potential risk posed by the site.

The Baseline Risk Assessment prepared for the ACS site indicates that VOCs typically make-up the largest percentage of the total risk calculated for the various current and future exposure scenarios (up to 96.8%)(See Tables 7-19 to 7-37 of the Baseline Risk Assessment). All of the target compounds identified for the upper aquifer in the FS (refer to Table 4-1 in the FS) are VOCs except bis(2-chloroethyl) ether. The SVOCs identified as target compounds as part of the FS in the defined soil and waste materials (refer to Tables 4-2 thru 4-6 in the FS) are predominantly phthalates, polynuclear aromatic hydrocarbons (PNAs), and chlorinated benzenes. As discussed in the FS, these SVOCs tend to be immobilized in the soil environment by natural attenuation mechanisms and were not detected in groundwater samples. In addition, the total average concentrations of VOCs were an order-of magnitude or more higher than the SVOCs in both the defined soil and buried waste areas.

The Baseline Risk Assessment also indicates that the dominant human health risks, non-cancer and cancer risks, are posed through exposure to the groundwater, and contact with soil and waste. Based upon the Baseline Risk Assessment, the remedial action selected for the ACS site should focus on mitigation of the exposure to VOCs thorough the groundwater, and soils and waste, resulting in a significant reduction in the potential risk posed by the site.

Current Land Use exposure scenarios and exposure pathways included in the Baseline Risk Assessment were:

- Trespasser- Child
  Direct contact with soils, wastes, surface water, and sediments through incidental ingestion, dermal absorption and inhalation of VOCs in the ambient air and dust

- ACS Worker
  Inhalation of VOCs in the ambient air and dust

- Off-site Resident-Adult or Child
  Direct contact with contaminated groundwater (lower aquifer) through ingestion, dermal absorption, and inhalation; and inhalation of VOCs in the ambient air and dust

- Off-site Resident-Child
  Direct contact with contaminated groundwater (upper aquifer) through incidental ingestion and dermal absorption

All of the groundwater exposures will be mitigated upon implementation of the groundwater pump and treat system during the first phase of remediation.

The Baseline Risk Assessment also evaluated future risks of a hypothetical, future on-site resident. This is an unrealistic scenario which was evaluated at U.S. EPA's insistence. From a practical standpoint, the ACS site and Griffith Landfill will not be used as residential land due to the nature of the site. Furthermore, the zoning of the site can remain industrial simply through the use of institutional controls. Given the above, the remedy should focus on risk reduction for intended future land use, rather than unrealistic and hypothetical land uses. The characterization of future land use is critical since it dictates the level of risk reduction required through the establishment of clean-up goals. The clean-up goals, in turn, drive the remedial technology requirements.

## DETAILED COMPARISON OF ISVE, SPBT, AND LTTT FOR BURIED WASTES

Alternative 5 and Alternative 6B, originally under consideration by the U.S. EPA, differ only in their treatment of the defined buried waste areas. In Alternative 5, wastes would be treated with ISVE. In Alternative 6B, wastes would be treated with LTTT. In addition, SPBT is an innovative technology that should also be considered for the waste matrix. The field of biotechnology is rapidly advancing and should also be considered as a possible alternate technology. Elements of the Proposed Plan not involving the defined buried waste areas include:

- Site dewatering to lower the water table below the depth of buried wastes and contaminated soil
- Excavation and off-site incineration of intact buried drums in the On-Site Containment Area
- Excavation and off-site landfilling of miscellaneous debris
- ISVE treatment of defined contaminated soil areas.

The U.S. EPA has indicated that an ISVE pilot study will be performed in the On-Site waste areas as a part of the Proposed Plan, which indicates acknowledgement of ISVE as a potentially viable alternative for the contaminant concentrations and matrix within the waste at the site. It is stated in the Proposed Plan that ISVE is not considered for the Off-Site areas "due to the large number and random distribution of drums". The entire site contains a similar composition of contamination, and the only significant difference between the On-Site Areas (the Sludge Bottom/Treatment Lagoon Area, in particular) and Off-Site Containment Area is the U.S. EPA's perception of the condition and distribution of buried drums.

## THRESHOLD CRITERIA EVALUATION

The U.S. EPA Threshold Criteria, Primary Balancing Criteria, and Modifying Criteria are discussed as they pertain to the defined buried waste areas at the ACS site. Overall protection of human health and the environment and compliance with ARARs are threshold requirements that must be met by each alternative in order to be eligible for selection. The U.S. EPA, in stating during past meetings and correspondences that either Alternative 5 or Alternative 6B were under consideration as their preferred remedy, has implied that both ISVE and LTTT treatment in the defined buried waste areas meet the threshold requirements.

SPBT would also be expected to meet these threshold requirements. Therefore, all three of these technologies are eligible for selection for the defined buried waste areas, and the U.S. EPA should balance the trade-offs identified in the detailed analysis for the primary balancing criteria.

**Overall Protection of Human Health and the Environment**

A primary exposure pathway from the site is the migration of contaminants in groundwater. The installation of a groundwater extraction and treatment system mitigates this pathway. After the groundwater treatment system has been installed, source treatment of the mobile contaminants is required to minimize the potential to further contaminate groundwater at the site. The Proposed Plan includes groundwater extraction and treatment and in-situ vapor extraction of defined contaminated soil areas to mitigate immediate threats and prevent further contaminant migration.

The potential effectiveness of ISVE in the defined buried waste areas cannot be determined at this time, since analogous contaminant matrices and concentrations have yet to be treated with this technology. However, the same can be said for LTTT and SPBT. However, in our opinion, all three of these technologies can potentially be effective.

The use of LTTT and SPBT would require the excavation of the defined buried waste areas. The unknown nature of the buried wastes poses numerous potential short-term risks during excavation. These risks include:

- Explosion and health hazards due to volatilization of organics
- Explosion and other health and safety hazards due to the mixing of incompatible materials
- Other health and safety hazards associated with the disturbance of wastes in the subsurface which cannot be adequately defined by sampling.

Modifying the Proposed Plan as we have recommended would allow testing of ISVE on a pilot study basis in the areas defined as buried wastes. LTTT and SPBT could still be stipulated as contingent technologies for the defined buried waste areas and subsequent pilot studies performed. Groundwater and ISVE treatment in the defined contaminated soil areas would still be implemented. The ISVE pilot study period, as well as the time period to implement LTTT or SPBT if the ISVE pilot study in the defined buried waste areas proves unsuccessful, would not impact the overall time period to complete the remedy for the entire site. ISVE in the contaminated soil areas would operate five to ten years and groundwater treatment at least thirty years.

By stipulating an ISVE pilot study in the On-Site Areas in the Proposed Plan, the U.S. EPA is acknowledging that there are some potential benefits to trying this technology on the buried waste matrix. If ISVE can achieve sufficient removal in the buried waste areas, the negative short-term effectiveness issues associated with excavation would be avoided. Since a significant portion of the defined buried waste volume is located in the Off-Site Containment Area, it would follow that there are more benefits to be achieved by implementing ISVE in this area and avoiding the potential short-term risks described above. If the ISVE pilot study in the defined buried waste areas proves unsuccessful, the time period required to implement LTTT or SPBT would not impact the overall cleanup of the ACS site, or pose any additional environmental or health risks to the surroundings or public.

We do not agree with the U.S. EPA's rationale for distinguishing between the On-Site and Off-Site Areas and limiting the ISVE pilot study strictly to the On-Site Areas. The VOCs and SVOCs detected in the waste contaminant matrix, as well as their respective concentrations, are equivalent between the two areas (particularly between the Sludge Bed/Treatment Lagoon Area and the Off-Site Containment Area). Past history of the Off-Site Containment Area indicates that the drums in the Off-Site Containment Area were crushed or in deteriorated condition prior to burial (See Letter: Adams to Hartwick, 1/31/92, AR No. 176). Under these circumstances, the buried drums and debris should not severely impede air flow paths and resulting effectiveness of ISVE in this area. Test pits could be excavated in the Off-Site Containment Area to better characterize the distribution and condition of buried drums and debris.

### Compliance with ARARs
The U.S. EPA stated in the Proposed Plan indicates that either approach will comply with ARARs. The Administrative Record does not include an identification of ARARs by the Indiana Department of Environmental Management (IDEM).

## PRIMARY BALANCING CRITERIA

### Long Term Effectiveness and Permanence
In the long term, LTTT would probably result in lower residual concentrations of contaminants, but would not increase the usability of the site, since treatment residuals, as with ISVE or SPBT, would still remain at the site. If ISVE or SPBT prove successful in the defined buried waste areas, all three methods of treatment in the defined buried waste areas would provide similar levels of long-term

in the defined buried waste areas would provide similar levels of long-term effectiveness and permanence. Moreover, long-term effectiveness of the remedy would not be compromised if the ISVE pilot study in the defined buried waste areas proves unsuccessful, because LTTT or SPBT could then implemented as a contingency remedy.

One of the reasons given by the EPA for the selection of LTTT over ISVE for the treatment of buried wastes is the potential ability of LTTT to more effectively remove SVOCs. It should be noted that the Proposed Plan also includes ISVE treatment in the defined contaminated soil areas, which still represents the majority of the volume to be treated at the ACS site. Since SVOCs are also present in areas defined as contaminated soil, the U.S. EPA has accepted the fact that residual SVOC concentrations will remain on-Site to be managed in another manner following completion of the treatment portion of the remedy (i.e., containment). As discussed earlier, it is not likely that enhanced subsurface biodegradation of the SVOCs using an ISVE/bioventing approach will be sufficient to degrade the SVOCs to health-based cleanup levels. The multi-ring PNAs, chlorinated benzenes, and several of the phthalates, which represent the primary SVOCs of concern, are only marginally biodegradable under optimum conditions. The Proposed Plan's stipulation of ISVE in the defined contaminated soil areas, which represents the majority of the volume to be treated, would appear to negate the primary advantage that LTTT offers over ISVE involving the potential ability to treat SVOCs.

As stated in the FS, SVOCs not amendable to ISVE treatment (e.g., phthalates, PNAs) do not pose a threat of groundwater impact. These compounds are immobilized in the soil environment by natural attenuation mechanisms and were not detected in groundwater samples collected from the ACS site. The risk associated with these SVOC residuals that may remain following ISVE treatment in either the defined buried waste or contaminated soil areas can be managed through the use of a soil cover, containment, and other risk management options (e.g., deed restrictions).

The buried waste at the site does not pose a risk to human health unless there is direct contact, ingestion (including groundwater), or inhalation of the waste or constituents. Currently the site is fenced, or the waste is covered with soil or vegetation, so there is little potential for direct contact, ingestion, or inhalation and the site will have a groundwater pump and treat system. The primary risk of contact, ingestion, or inhalation is associated with surface soils in the Kapica/Pazmey area. A soil cover in conjunction with ISVE will mitigate this exposure pathway. As stated previously, VOCs comprise up to 96.8% of the risk for a given exposure scenario based on the results of the Baseline Risk Assessment. The use of LTTT or SPBT involves excavation, which inherently remedy which can effectively remediate wastes in-situ is preferred over excavation.

### Reduction of Toxicity, Mobility, or Volume through Treatment

The U.S. EPA has expressed concern that ISVE will not reduce contaminant concentrations to acceptable levels within the defined buried waste areas. ISVE has been proven as a highly successful method of remediating VOC contaminated soils at numerous sites, including many CERCLA sites. Records of Decisions (RODs) for other NPL sites have been issued for ISVE where SVOC, polychlorinated biphenyls (PCBs), and metals contamination existed. These RODs have acknowledged the immobile nature of these contaminants, and the ability of soil cover, containment, and risk management (e.g., deed restrictions) to provide long term protection from exposure.

Biological treatment can potentially degrade a wide range of organic compounds, including SVOCs. SPBT has been demonstrated to degrade SVOCs associated with wood treating and petroleum related contamination, and may be applicable the concentrations and matrix of contaminants found at the ACS site. Conventional aerobic treatment approaches, which are incorporated in current state-of-the-art SPBT systems, are only marginally effective on PCBs, chlorinated VOCs, multi-ring PNAs, and several of the phthalates which have been identified as target compounds in the FS. However, biological treatment approaches which have been developed to degrade these recalcitrant compounds for wastewater applications (refer to Section 4.2.7.2 of the FS) can also be adapted for a slurry-phase approach. SPBT of the waste matrix warrants consideration because of its innovative nature and potential ability to degrade a wide range of organic contaminants, including SVOCs.

### Short Term Effectiveness

ISVE offers a significant advantage with regards to short-term effectiveness over LTTT and SPBT, because excavation of wastes and soil is not required. Because of the high levels of VOCs in the buried wastes, there is potential for significant volatilization and airborne migration of VOCs during excavation activities. In hot weather, volatilization could be very difficult to predict and control. Although the contaminants appear to be in an equilibrium state now, excavation could cause mixing of incompatible wastes with resulting risk to workers and residents in the area. The U.S. EPA readily acknowledges these risks and, therefore, specified precautions in its Proposed Plan to limit the size of the excavation and enclose the excavation with a structure. However, it is unlikely that these control measures would prevent an uncontrolled situation in the event highly volatile or incompatible wastes are encountered. The time between recognition in the field that volatilization is occurring at an excessive and potentially dangerous rate and explosive conditions actually exist within the building could be very short.

Modifying the Proposed Plan as we have recommended would allow testing of ISVE on a pilot study basis in the areas defined as buried wastes. LTTT and SPBT would be stipulated as potential contingent technologies for the defined buried waste areas and concurrent pilot studies conducted. If ISVE can achieve sufficient removal in the defined buried waste areas, the negative short-term effectiveness issues associated with excavation would be avoided. Since a significant portion of the defined buried waste volume is located in the Off-Site Containment Area, it would follow that there are more benefits to be achieved by implementing ISVE in this area and avoiding the potential negative short-term risks described above. The ISVE pilot study period, as well as the time period to implement LTTT or SPBT if the ISVE pilot study in the buried waste areas proves unsuccessful, would not impact the overall time period to complete the remedy for the entire site. ISVE in the contaminated soil areas would operate five to ten years and groundwater treatment at least thirty years.

**Implementability**

Because of the wide range and high concentrations of contaminants found at the ACS site, bench and pilot scale testing will be required of whatever treatment technology is selected to address wastes at the site. ISVE treatment of the defined buried waste areas offers a significant advantage by utilizing the treatment method for wastes that is preferred by the U.S. EPA for the defined contaminated soil areas at the ACS site. The remedial action approach for ISVE treatment in the defined buried waste areas would consist of the following:

- The first step in the remediation process would be the design and installation of the groundwater pumping and treatment system. Once installed, the primary migration pathway from the site would be mitigated.

- Design and installation of the vapor extraction system for treatment of defined contaminated soil areas would begin concurrent with installation of the pump and treat system. This system would be installed in the zone of contaminated soils which surrounds the waste areas at the site. System design would include a pilot test to optimize design of the full-scale system.

- A section in one or two of the worst case waste areas would be designated for use in a large scale pilot test of the effectiveness of ISVE. A small number of wells would be installed in the waste areas, and would be operated for a predetermined period.

- If problems are encountered during the waste ISVE pilot testing program, appropriate modifications could be developed prior to implementing the full-scale system. In the extreme case, where ISVE proves unsuccessful for waste treatment, LTTT or SPBT would be pilot tested for the defined buried waste areas.

It is possible that a statistical difference in contaminant concentrations in the defined buried waste areas will not be evident at the conclusion of the ISVE pilot study period, but the vapors extracted will indicate whether or not VOCs are being removed. Monitoring of pressure gradients and subsurface and exhaust vapor concentrations will provide sufficient data to project the long-term effectiveness of ISVE treatment of wastes. Monitoring data will allow for the evaluation of air flow paths and the impacts of subsurface obstructions (e.g., buried drum carcasses and waste sludges) on potential removal efficiencies. The ability of ISVE to achieve uniform direct air contact with the contaminants through all portions and depths of the defined buried waste areas, the key criteria for effective removal by ISVE, can easily be evaluated as part of the pilot study.

As previously discussed, the high total organics concentrations and free liquids and sludges present in the defined buried waste areas may not be amenable to LTTT. If LTTT is not capable of treating the waste matrix as determined by the pilot study results, the selection of Alternative 6 as currently presented in the Proposed Plan could require the buried wastes to be treated by on-Site incineration (Alternative 6A). There may be significant public opposition to on-Site incineration. On the other hand, modifying the Proposed Plan to incorporate our recommended changes would provide for consideration of other treatment options for the defined buried waste areas other than LTTT (e.g., ISVE and SPBT). These technologies would be evaluated by conducting concurrent pilot studies during the RD/RA.

As mentioned above, including SPBT in the Proposed Plan offers another treatment option for the defined buried waste areas in the event both ISVE and LTTT prove ineffective based on the pilot study results. Including SPBT in the Proposed Plan for the defined buried waste areas would allow the pilot testing of this innovative technology on a more complicated contaminant matrix. If proven successful during pilot testing, these results could then be applied throughout the entire CERCLA program for analogous contaminant.

A significant portion of the waste matrix may exist in the form of solidified or partially solidified paint, ink, or resin sludges, etc. Wastes present in a solidified or partially solidified state may not be amenable to either LTTT or SPBT (i.e., cannot be resolubilized and/or lack of a volatile matrix to evaporate) which would result in a residual requiring containment. This material could also pose material handling difficulties by clogging conveyance systems, mixing equipment, etc., and may have to be separated prior to treatment. Separation of these solidified and partially solidified materials from the remaining waste matrix could prove difficult. The use of ISVE to remove VOCs followed by containment of the remaining residuals may be a more effective approach to handling the waste matrix if solidified and partially solidified materials pose above-ground treatment and handling problems. The use of test pits and pilot studies of all three technologies during the RD/RA would better define the presence of solidified and partially solidified materials and allow an evaluation of their impact on treatment and handling requirements.

**Cost**

A cost comparison of ISVE, LTTT, and SPBT was made based on FS estimates for Alternatives 5, 7B, and 8B, which involve the use of these technologies to treat the entire site (i.e., the total volume in both the defined buried waste and contaminated soil areas). Even though the actual costs to treat the defined buried waste areas are only a portion of the estimates for each respective FS alternative, the FS cost estimates still provide a fair basis of comparison. The groundwater treatment costs, which are included in these totals, are similar for each of the alternatives. Based on a comparison of the FS cost estimates, ISVE is expected to be the least costly technology followed by SPBT and LTTT. The FS cost estimate for Alternative 5 is $33 million, Alternative 7B is $64.4 million, and Alternative 8B is $43.2 million.

It is believed that the costs associated with ISVE and LTTT can be estimated with a higher degree of confidence than SPBT. The lack of data relating reaction rates, required slurry concentrations, etc. associated with the ACS site contaminant matrix make it difficult to realistically size the slurry phase reactors and estimate residence times. It is also difficult to estimate the degree of volatilization that may occur during SPBT and its resulting impact on air treatment costs, which could be substantial.

## MODIFYING CRITERIA

**State Acceptance**

The IDEM had recommended ISVE (Alternative 5) as the preferred remedy in a letter from Mr. Reggie Baker Jr., Chief of the Superfund Section, IDEM, to Mr. Wayde M. Hartwick, Remedial Project Manager U.S. EPA dated December 6, 1991. The letter stated that IDEM "staff reviewed and compared the eight (8) alternative remediation methods. Alternatives #5 and #6 were distinguished as the most appropriate remediation methods." Later in the letter IDEM stated "We recommend #5 as the preferred alternative". The IDEM stated that Alternative 5 would be less expensive than Alternative 6 and would be more readily accepted by the public.

### Community Acceptance

There has been discussion that there may be significant community resistance to thermal treatment alternatives for soil and waste at the site. The selection of ISVE provides the opportunity to treat the waste in-situ without direct thermal treatment of the wastes. The probability of community acceptance of ISVE will likely be much greater than for thermal treatment, because the risks associated with excavation are avoided under ISVE.

[CHI 603 03d]
20007001-Appendix A

# ATTACHMENT 1

## Members of the ACS Organizational Group Steering Committee

**MEMBERS OF THE AMERICAN CHEMICAL SERVICES SITE ORGANIZATIONAL GROUP**

| | | |
|---|---|---|
| 1. | Abbott Laboratories | Abbot Laboratories |
| 2. | Acme Metals Incorporated | Acme Steel Company |
| 3. | Allied-Signal Inc. | Allied Chemical Corp. |
| | | Baron Blakeslee, Inc. |
| | | Printing Plate Supply |
| | | Woodstock Die Casting |
| 4. | Amerace Corporation | Emconite/Stimsonite |
| 5. | American Chemical Service Co., Inc. | American Chemical Service Co, Inc. |
| 6. | American National Can Company | American National Can Company |
| | | Guardian Packaging Corporation |
| 7. | American Roller Company | American Roller Company |
| 8. | Ashland Chemical, Inc. | Ashland Chemical, Inc. |
| 9. | Ashland Petroleum Company | Ashland Oil (Big Ben) |
| 10. | Atlas Electric Devices Company | Atlas Electric Devices Company |
| 11. | Avery Dennison | G.J. Aigner Co. |
| 12. | Bagcraft Corporation of America | Bagcraft Corporation of America |
| 13. | Bagcraft Corporation of America | Bagcraft Corporation of America |
| 14. | Baxter Healthcare Corporation | Hamilton Industries |
| 15. | Beatrice | Fiberite |
| | | Hi-Temp |
| | | Muter |
| 16. | Bemis Company, Inc. | Lustour Corporation |
| 17. | Bemis Manufacturing Company | Bemis Manufacturing Company |
| 18. | Borden, Inc. | Borden, Inc. |
| 19. | Borg-Warner Corporation | Marbon Chemical |
| | | Spring Division |
| 20. | BP America Inc. | Hauley Products |
| 21. | The Budd Company | The Budd Company |
| 22. | Candoc | Cudner & O'Connor |
| 23. | Champion International | Central Wax Paper |
| 24. | Chapco | Chicago Adhesive Products |
| 25. | Chevron Corporation | Kewanee Industries (Fermco Laboratories/Nutrasweet) |
| 26. | Chicago Finished Metals | Chicago Finished Metals |
| 27. | Chicago Loop Auto Refinishing | Chicago Loop Auto Refinishing |
| 28. | The Coco-Cola Company | The Coca-Cola Company |
| 29. | Continental White Cap. | Continental Can Co. |
| 30. | Cook Composites and Polymers | Freeman Chemical |

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|---|---|---|
| 31. | Cooper Industries, Inc. | Belden Manufacturing |
| 32. | CSX Transportation, Inc. | CSX Transportation, Inc. |
| 33. | CTS Corporation | CTS Microelectronics |
| 34. | Daubert Industries, Inc. | Daubert Chemical |
| 35. | DeMert & Dougherty, Inc. | DeMert & Dougherty, Inc. |
| 36. | The Dexter Corporation | Dexter-Midland |
| 37. | Dietzgen Corporation | Eugene Dietzgen |
| 38. | R.R. Donnelley & Sons Company | R.R. Donnelley & Sons Company |
| 39. | The Dow Chemical Company | The Dow Chemical Company<br>J.W. Mortell (The Mortell Company) |
| 40. | E.I. du Pont de Nemours and Company | E.I. du Pont de Nemours and Company |
| 41. | Federal Paper Board Company, Inc. | Federal Paper Board Company, Inc. |
| 42. | Flint Ink Corporation | Sinclair and Valentine |
| 43. | The Flintkote Company | The Flintkote Company |
| 44. | Fort Dearborn Litho | Forth Dearborn Litho |
| 45. | Gast Manufacturing Corporation | Gast Manufacturing Corporation |
| 46. | GATX | General American Transportation Corporation |
| 47. | GCA | Precision Scientific |
| 48. | GenCorp Inc. | General Tire & Rubber Company |
| 49. | General Motors Corporation | General Motors Corporation |
| 50. | | |
| 51. | Glidden Co. | Glidden Co.<br>Glidden-Durkee<br>Gliden-Nubian |
| 52. | Graham Paint & Varnish | Graham Paint & Varnish |
| 53. | Great Lakes Terminal & Transport Corporation | Great Lakes Terminal & Transport Corporation |
| 54. | Grow Group, Inc. | Martin Varnish |
| 55. | The C.P. Hall Co. | The C.P. Hall Co. |
| 56. | Handschy Industries | St. Clair Manufacturing Corp. |
| 57. | Hydrite Chemical Co. | North Central Chemicals |
| 58. | Hydrosol, Inc. | Hydrosol, Inc. |
| 59. | IB Distributors, Inc. | Illinois Bronze Paint |
| 60. | ICI Specialty Inks | Thiele Engdahl |
| 61. | IMCERA | Mallinckordt, Inc. |
| 62. | Industrial Coatings Group, Inc. | Joanna Western Mills Co. |
| 63. | INX International Ink Co. | Acme Printing Ink Company<br>Packaging Inks |
| 64. | ITT Corporation | ITT H.M. Harper Division |
| 65. | James River Paper Co., Inc. | Kalamazoo Vegetable<br>H.P. Smith |

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| 66. | Johnson Matthey Inc. | Breve Corporation (formerly Meyercord Co.) |
| 67. | Johnson & Johnson | J.T. Clark Co. |
| 68. | S.C. Johnson & Son, Inc. | S.C. Johnson & Son<br>S.C. Johnson Wax Co.<br>Johnson Wax Co. |
| 69. | Kalmus and Associates, Inc. | Kalmus and Associates, Inc. |
| 70. | KNX Companies Inc. | KNS Companies Inc. |
| 71. | Krueger Ringier | Chicago RotoPrint |
| 72. | LCKCO, Inc. | Advertising Metal Display Industries, Inc. |
| 73. | Eli Lilly and Company | Eli Lilly and Company |
| 74. | The Lockformer Company | The Lockformer Company |
| 75. | Mallinckrodt, Inc. | Mallinckrodt, Inc. |
| 76. | Martin Marietta Corporation | Martin Marietta Corporation |
| 77. | Matthews Paint Company | Matthews Paint Company |
| 78. | Maxus Energy Corporation | Occidental Chemical Corp. (formerly Diamond Shamrock) |
| 79. | The Mead Corporation | The Mead Corporation |
| 80. | Memphis Environmental Center, Inc. | Velsicol Chemical Corporation |
| 81. | Methode Electronics, Inc. | Methode Electronics, Inc. |
| 82. | Midwest Sintered Products Corp. | Midwest Sintered Products Corp. |
| 83. | Miles Inc. (Pending) | |
| 84. | Milton Bradley Company | Playskool, inc. |
| 85. | Minnesota Mining and Manufacturing Company | Minnesota Mining and Manufacturing Company |
| 86. | Mobil Oil Corporation | American Marietta<br>Mobil Chemical<br>Mobil Finishes<br>Mobil Oil Corporation<br>Superior Oil |
| 87. | Montgomery Ward & Co., Inc. | Montgomery Ward & Co., Inc.<br>Standard T Chemical Company, Inc. |
| 88. | Morton International, Inc. | Adcote Chemical<br>Bee Chemical<br>Morton Chemical |
| 89. | Motorola Inc. | Motorola, Inc. |
| 90. | G.J. Nikolas & Co., Inc. | G.J. Nikolas & Co., Inc. |
| 91. | The O'Brien Corporation | The O'Brien Corporation |
| 92. | Owens Corning Fiberglas | Owens Corning Fiberglas |
| 93. | Packaging Corporation of America | Ekco Products Inc. |
| 94. | Packard Instrument Co. | Packard/Canberra |
| 95. | Parisian Novelty Company | Parisian Novelty Company |
| 96. | Phillips and Martin | Phillips and Martin |

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| 97. Plicon Corporation | Packaging Laminators |
| 98. PPG Industries, Inc. | Houston Chemicals<br>Pittsburgh Plate Glass |
| 99. Pratt & Lambert, Inc. | Pierce and Stevens Corp. |
| 100. Precision Brand Products, Inc. | DuPage Manufacturing |
| 101. Premier Industries | Premier Paint and Varnish |
| 102. Primerica Holdings, Inc. | American Can Company |
| 103. Reichhold Chemicals, Inc. | Reichhold Chemicals, Inc. |
| 104. Reliable Paste & Chemical Co. | Reliable Paste & Chemical Co. |
| 105. Reliance Electric Company | Chicago Thrift Etching Corporation |
| 106. Rogers Cartage Company | Rogers Cartage Company |
| 107. Rollprint Packaging | Rollprint Packaging |
| 108. Rust-Oleum Corp. | Rust-Oleum Corp. |
| 109. Safety Kleen Envirosystems Company | Inland Chemical Corporation<br>McKesson Envirosystems Company |
| 110. G.D. Searle & Co. | Searle Chemicals Inc. |
| 111. The Sherwin-Williams Company | The Sherwin-Williams Company |
| 112. SmithKline Beecham Pharmaceuticals | DAP, Inc./Inland Coatings/Master Bronze (Note: see USG) |
| 113. Roy Strom Refuse Removal Service, Inc. | Roy Strom Refuse Removal Service, Inc. |
| 114. Stuart Industrial Coatings, inc. | Stuart Paint |
| 115. T.L. Swint Industries, inc. | J.A. Gits Corp. |
| 116. Technical Products, Inc. | Technical Petroleum |
| 117. TeePak, Inc. | TeePak, Inc. |
| 118. Teledyne Post | Frederick Post |
| 119. Texaco Inc. | Texaco Inc.<br>Chemplex Company |
| 120. Tingstol Co. | Tingstol Co. |
| 121. Trinova | J.P. Gits Molding<br>Sterling Engineered Products, Inc. |
| 122. Union Carbide Corporation | Haynes<br>London Chemical<br>Union Carbide Linde<br>Union Carbide Visking |
| 123. Union Oil/Unocal | W.H. Barber Chemical Co. |
| 124. Union Tank Car Company | Lithcote Company |
| 125. United Technologies Corporation | Amos Molding Products/United Technologies Automotive<br>Dryden Rubber Co./Sheller Globe Corporation<br>Interchemical Corporation/Inmont Corporation |

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| 126. USG Corporation | LaMirada/DAP, Inc./Inland Coatings/Master Bronze (Note: see SmithKline Beecham) |
| 127. USX Corporation | U.S. Steel |
| 128. The Valspar Corporation | The Valspar Corporation |
| 129. Vitamins, Inc. | Vitamins, Inc. |
| 130. Vulcan Corporation | Vulcan Corporation |
| 131. Walbro Corporation | Auburn Diecast Corp. |
| 132. Whirlpool Corporation | Whirlpool Corporation |
| 133. Whiteco Industries, Inc. | White Advertising Company<br>White Graphics Systems |
| 134. Zenith Electronics Corporation | Zenith Electronics Corporation |
| 135. Miles Inc. | Miles, Inc. |
| 136. Alumax Inc. | Alumax Inc. |
| 137. Nordson Corporation | Nordson Corporation |
| 138. Arrow Plastic Manufacturing Company | Arrow Plastic Manufacturing Company |
| 139. Follett Library Book Company | Follett Corporation |
| 140. Central Can Company | Central Can Corporation |
| 141. Illinois Tool Works Inc. | Illinois Tool Works Inc. |

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